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REPORTS ON THE SCIENTIFIC RESULTS OF THE EXPEDITION TO THE
EASTERN TROPICAL PACIFIC, IN CHARGE OF ALEXANDER AGASSIZ,
BY THE U. S. FISH COMMISSION STEAMER "ALBATROSS," FROM
OCTOBER, 1904, TO MARCH, 1905, LIEUT. COMMANDER L. M. GARRETT,
U. S. N., COMMANDING.

VI.

MADREPORARIA.

BY T. WAYLAND VAUGHAN.

WITH TEN PLATES.

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No. 3. — *Reports on the Scientific Results of the Expedition to the Eastern Tropical Pacific, in charge of Alexander Agassiz, by the U. S. Fish Commission Steamer "Albatross" from October, 1904, to March, 1905, LIEUT. COMMANDER, L. M. GARRETT, U. S. N., COMMANDING.*

VI.

MADREPORARIA. By T. WAYLAND VAUGHAN.¹

Mr. Alexander Agassiz has submitted to me for determination and report the Madreporaria collected during the "Albatross" Expedition of 1904-1905. The collections are small, and represent only seven localities.

Two species, *Pocillopora lacera* Verrill and *Astrangia haimi* Verrill, were obtained from Taboguilla Island, Bay of Panama, the former at a depth from low tide to 1 fm., the latter between tides.

Three species were obtained in the vicinity of the Galapagos Islands, viz. :—

Madrepora galapagensis, sp. nov., depth 300 fms.

*Desmophyllum galapagense*², sp. nov., depth 300 fms.

Balanophyllia galapagensis, sp. nov., depth 100 fms.

One species, *Bathyactis marenzelleri*, sp. nov., was collected off Callao, Peru, at a depth of 3,209 fms. The same species was obtained at Station 4721, about half way between the Galapagos and Garrett Ridge, at a depth of 2,084 fms., and probably at Station 4732, southwest of Garrett Ridge, at a depth of 2,012 fms.

Two species, *Pocillopora diomedea* and *Porites paschalensis*, both new species, were collected on the shore of Easter Island.

Five species, a variation of *Pocillopora cespitosa* Dana and four species of *Acropora*, were obtained at Manga Reva.

¹ The Director of the U. S. Geological Survey has allowed me to prepare this Report as part of my official work.

² The name *Desmophyllum galapagensis*, on Plate 1 printed as originally proposed, has been changed to the more correct *D. galapagense*.

The two shore species from Taboguilla are well-known Panamic forms. The two from Easter Island group with species known from the South Pacific and Indian Ocean. The species from Manga Reva belong to the fauna of the Southwestern Pacific and Indian Ocean.

The literature on the deep-sea Madreporaria of the Eastern Pacific is almost nil. Moseley, in his "Deep-Sea Corals" obtained by the "Challenger" Expedition, described a few, and Dr. von Marenzeller has published a report on the "Stein- und Hydro-Korallen" collected off the west coast of Central America to the Galapagos, to the west coast of Mexico, and in the Gulf of California, by the "Albatross" in 1891.¹ He records eight species of Madreporaria, five of which are specifically identified, viz. :—

Desmophyllum cristagalli M. Edw. & H.
Caryophyllia diomedea von Marenzeller.
Madrepora oculata Linné.
Cladocora arbuscula (Le Sueur).
Bathyactis symmetrica (Pourtalès).

I am able to add four species. There is a considerable quantity of unstudied deep-sea material from the Pacific coast of America in the United States National Museum, but I have not as yet been able to describe it. However, I hope to do so within a short time in connection with monographing the Tertiary coral faunas of the Western United States. The Hawaiian Expedition of the "Albatross," 1902, was fortunate in procuring a considerable collection of deep-sea Madreporaria. I have described that collection for the United States Bureau of Fisheries, and found it very interesting for comparison with the faunas of the Southwestern Pacific and Indian Ocean on one side and that of Western America on the other.

These notes are presented to show the meagerness of our knowledge of the deep-sea Madreporaria of the greater portion of the Pacific Ocean. We do not yet know enough to undertake the discussion of the broader problems of geographic distribution. The collection made by the "Albatross" in 1904–1905, though small, is interesting and important, as it makes a distinct addition to our knowledge of Pacific deep-sea Madreporaria.

The Panamic specimens are omitted from the following discussion of the species.

¹ Bull. Mus. Comp. Zoöl., 43, p. 75–87, 3 pls., 1904.

Desmophyllum galapagense, sp. nov.

Plate 1, figs. 1-1b.

Corallum curved, attached by an expanded base; transverse outline of calice, elliptical.

Measurements: height, 15 mm.; diameter immediately above basal expansion, 2.5 mm.; greater diameter of calice, 6.75 mm., lesser, 6 mm.

The corallum wall is very thin, its outside is polished and glossy, but shows minute transverse lines of growth that are parallel to dentations on its upper edge which correspond in position with the septa.

Septa thin, in four complete cycles, primaries and secondaries of equal size, with exsert margins, about 1.5 mm., tertiaries shorter, quaternaries still smaller and may be rudimentary. The septal faces granulated, granulations small, showing arrangement parallel to the septal margin and also in linear series.

Calicular fossa very deep and narrow. No columella.

Locality:—Station 4642, southeast face of Galapagos Islands, 5 miles from southeast end of Hood Island; depth, 300 fms.; bottom, broken shells and Globigerina; temperature of the bottom, 48.6° F. The specimen grew attached to *Madrepora galapagensis*, sp. nov.

Remarks:—*Desmophyllum galapagense* is close to *D. alabastrum* Alcock, but the latter species has the third and fourth cycles of septa buried "in the depths of the cup where at first they escape notice." It is very close to *D. eburneum* Moseley, and may ultimately be combined with that species, it differs from the latter, however, by the entire absence of costae, and none of the primary septa bend outward beyond the margin of the calice.

Madrepora galapagensis, sp. nov.

Plate 1, fig. 2; plate 2, figs. 1-1b.

Corallum in its basal portion thick and compact; branches anastomosing. The colonies evidently attain considerable size. The terminal branchlets are stout, rather short, with thick bases. One branchlet measures 20 mm. in length, 7 mm. in diameter at the base, terminal calice 4.5 mm. in diameter. Some branchlets are shorter, others are longer, and the terminal calice may not have so great a diameter, but the branchlets are constantly relatively thick.

The calices on the branches are usually dichotomous in arrangement, occasionally there is opposite gemmation in a plane at right angles to the plane passing through the middle of the dichotomous calices. On the older portions of the corallum the coenenchyma is very highly developed and there is no definite calicular arrangement.

The fully developed terminal calices are about 4.5 mm. tall, and about 4 mm. in diameter measured between the thecal summits; 4.5 mm. is probably the maximum calicular diameter on a branchlet. On the basal portion of the corallum the calices are as much as 10 mm. apart, and range in diameter from 2.5 to 3.5 mm. in diameter. They are deep, even exceeding 3 mm. The elevation of the calicular

margins is variable, ranging from 1 mm., or even less, to 5 mm. At and just below the calicular margins are costae corresponding to the primary and secondary septa, they usually are not continued far down the outside of the corallite wall.

The coenenchyma is highly developed, absolutely solid, its surface striate, or checkered by superficial canals.

Septa in three complete cycles, the primaries are exsert between .5 and 1 mm., the secondaries less prominent, the tertiaries with scarcely elevated margins. The inner margins descend abruptly, those of the first two cycles extend to the axis, and may or may not form a weak, false columella. The septal faces are striate and granulate, septal edges entire.

The corallite cavities are solidly filled below by stereoplasm.

Locality: — Station 4642, southeast face of the Galapagos Islands, 5 miles from southeast end of Hood Island; depth, 300 fms; bottom, broken shells and *Globigerina*; temperature of the bottom, 48.6° F.

Remarks: — This species belongs near *Madrepora oculata* (Linné) but differs in its shorter, relatively thicker branches, and its more prominent and deeper calices.

Pocillopora cespitosa Dana var.

Plate 3, figs. 1-1b.

1846. *Pocillopora cespitosa* Dana, Zooph. Wilkes Expl. Exped., p. 525, plate 49, figs. 5, 5a.
 1846. *Pocillopora brevicornis* (pars) Dana, Zooph. Wilkes Expl. Exped., p. 526.
 1860. *Pocillopora cespitosa* Milne Edwards, Hist. nat. Corall., 3, p. 303.
 1869. *Pocillopora caespitosa* Verrill, Proc. Essex Inst., 6, p. 91.
 1886. *Pocillopora cespitosa* Quelch, Reef Corals, "Challenger" Rept., p. 66.
 1901. *Pocillopora caespitosa* Studer, Zool. Jahrb. Syst., 40, p. 399.

One specimen was obtained. It is a clump 8 cm. tall, 10.5 cm. long, and about 8.8 cm. wide. It is composed of rather crowded, compressed branches, that bear verruciform branchlets. In form it resembles the styloporoid variety of the species found in the Hawaiian Islands. The septa and columella are distinct, especially on the basal portion of the corallum, where the latter is often styliform.

For a description of the variations of this species, my report on the Hawaiian *Madreporaria*, U. S. Bureau of Fisheries Bulletin, should be consulted.

Locality: — Motus reef flats, Manga Reva, Paumotus.

Pocillopora diomedea, sp. nov.

Plate 2, figs. 2, 2a; plate 6, fig. 1.

Corallum composed of short, subterete or compressed elliptical, or wide, flattened blunt branches, the ends sometimes incrassate or subclavate. Seven broken branches were obtained, probably all belonging to the same colony, and because of the darker, reddish color of the lower ends the total length is probably represented.

Specimen.	Length.	Diameter of Lower End.		Diameter of Upper End.		Shape of Upper End.
		Greater.	Lesser.	Greater.	Lesser.	
1	46 mm.	17 mm.	11 mm.	7 mm.	5 mm.	Obtuse.
2	45	14	12.5	13	9	Obtuse, subclavate.
3	55	11	10	21	10	Obtuse, incrassate.
4 ¹	67	15	12	14	10	Obtuse.
5	59	15	13.5	22	14	Obtuse.
6	69	22	17.5	32.5	16.5	Obtuse, bifurcation 22 mm. below upper end.
7	66	30	12	{ 42.5 38.5	{ 12 } 16 }	Obtuse, bifurcation 36.5 mm. below upper end, measurements given for each branch.

¹ The specimen figured.

Verrucae obsolete or irregular in development. They may bear from three to five calices, scarcely elevated above the usual level of the surface of the branch, or may be as much as 3.5 mm. tall and covered by as many as 20 calices. The larger verrucae are appressed, greater diameter 6 mm., lesser, 3.5, with the apices distally directed. They are better developed along the more compressed edges than on the flatter sides. Their distance apart is too variable to possess any systematic value.

Calices with slightly elevated margins; deep over the whole surface, about 1 mm. near the lower end. The apical ones are separated by narrow, acute walls and have a maximum diameter of 1.5 mm.; those on the sides, about 30 mm. below the apex, are 1 mm. in diameter and are separated by walls from .5 to .75 mm. thick; those near the base (65 mm. from the apex), are about .75 mm. in diameter and are separated by an equivalent thickness of coenenchyma. The calices on the verrucae are about 1 mm. in diameter and are closer together than on the adjacent portions of the side of the corallum.

Septa are indistinct in the apical calices, distinct in practically all others, but somewhat irregular in development, usually best developed near the lower end of the branch. The number is twelve, two complete cycles, with occasional members of the third. A varying number, from one to six, are much thickened and have very exsert edges; but all, excepting one or both of the directives, are narrow, rendering the fusion to the columella invisible from above. The inner margins are spinulose. The columella is usually well developed, arises deep down in the

calice; it is rather thick and terminates in one or several prominent ascending spines.

The coenenchyma is usually very dense, its surface beset with isolated, erect, compressed, truncated spinules. A circle of more prominent spinules surrounds each calicular cavity, those intervening usually less prominent.

The corallites cavities often solidly filled with internal deposit, rendering the corallum very dense; tabulae, when present, from .5 to 1 mm. apart.

Locality:—Shore, Easter Island.

Remarks:—This is the most distinctly characterized species of Pocillopora that has come under my observation, as I know no other that is really very similar. The thick branched or frondose species in which the septa are well developed and the columella prominent are *P. modumanensis* Vaughan (Hawaiian Islands), *P. ligulata* Dana, *P. plicata* Dana, *P. coronata* Gardiner, *P. eydouxi* M. Edw. and H. and *P. elongata* Dana. *P. rugosa* Gardiner has in the lower calices a slender very prominent columella, but the septa are very indistinct; *P. capitata* Verrill, from Panama, in some of its variations appears to have distinct septa and a styloid columella. The only species whose name is listed above with which *P. diomedae* need be compared is *P. elongata* Dana. *P. elongata* has longer, thicker branches, more uniformly developed and uniformly distributed verrucae, the columella (judging from Verrill's re-description of the type)¹ is not so thick, and the texture much more porous. It is very probable that the exsert margins of a portion of the septa in *P. diomedae* and the compressed, truncated granulations of its coenenchyma constitute additional differences.

Bathyactis marenzelleri, sp. nov.

Plate 4, Figs. 1-1 b.

Base of the corallum circular, 22.5 mm. in diameter, almost flat, slightly concave in the middle. The wall is extremely thin and translucent. Thin, slightly wavy costae correspond to all septa, but become obsolete on the central portion of the base; those corresponding to the last cycle smaller and more irregular in development. The costal edges are irregularly, sometimes coarsely, dentate.

The calice is superficial, almost everted. Septa extremely thin, in four complete cycles, forming six septal groups, one group between each pair of primaries. The tertiaries fuse by a kind of calcareous membrane to the included secondary, and the quaternaries fuse nearer the wall by their inner margins to the included tertiary. There is an occasional rudiment of a fifth cycle. The margins of the primaries are very tall, projecting 9 mm. above the base, the secondaries are almost as prominent as the primaries, the tertiaries are slightly less prominent than the secondaries, the quaternaries are decidedly less prominent than the other septa. The outer portion of the septal margins is irregularly lacerate, the inner half between the columella and the periphery possesses from three to four distant, tall, erect, thin, spines. Septal faces without granulations, fluted, with distant carinae, some of which connect below with synapticula. These carinae vary from

¹ Proc. Essex Inst., 6, p 99, 1869.

somewhat less than 1 mm. to almost 2 mm. apart. From three to five thin, membraniform synapticula, formed by the basal fusion of opposed carinae, occur in each interseptal loculus.

The inner ends of the septa are united by a calcareous membrane, through which small, thin, spinose, septal processes project. The diameter of the columella platform is 5 mm.

Localities: — (*Type*) — Station 4721 between Galapagos and Barrett Ridge; depth 2,084 fms.; bottom, light brown Globigerina ooze, sponge, spicules, diatoms, a few Radiolaria; thermometer failed to register on the bottom; 1 specimen.

Station 4670 western edge of Milne Edwards Deep off Callao; depth 3,209 fms.; bottom, soft, light brown mud; temperature of the bottom, 35.4° F.; 3 specimens, partially decalcified, two were cleaned by boiling in a solution of caustic potash, and were easily identifiable.

A specimen of Bathyactis, which had been decalcified, was dredged at station 4732, between Barrett Ridge and Manga Reva, at a depth of 2,012 fms. This specimen is not specifically identifiable, but probably belongs to *B. marenzelleri*. Bottom, light gray, Globigerina ooze, sharks' teeth, and ear bones, manganese nodules, very few diatoms and radiolaria, sponge spicules; temperature of the bottom, 34.8° F.

Remarks: — This species according to Alcock's synopsis of the species of Bathyactis¹ obtained by the "Siboga" is nearest to *B. symmetrica* (Pourtales), as it possesses no pali and only four cycles of septa. But it differs markedly from that species. The shape of the septa and the character of their margins are entirely different — the great elevation of the septal margins and their peculiar laceration are very striking. *B. sibogae* Alcock is similar to *B. symmetrica*, differing by possessing five, instead of four, cycles of septa. *B. stephana* Alcock possesses elevated septal margins, but the base of the corallum is concave and there are five cycles of septa. Alcock's figure² of the last named species indicates that its septal margins are peripherally narrow or excavated, and that they are elevated near the calicular fossa, the reverse of the condition in *B. marenzelleri*. *B. hawaiiensis* Vaughan has a general similarity in form, but it possesses five cycles of septa, its septal margins are not so lacerate and the carinae on the septal faces are much more crowded, and bear spinose granulations. It therefore seems that *B. marenzelleri* is decidedly different from any other hitherto discovered species of the genus.

Balanophyllia galapagensis, sp. nov.

Plate 4, Figs. 2-2 b.

Corallum elongate, slightly curved, with broadly elliptical transverse outline. The lower end is broken and the calicular margin is somewhat, but not greatly, damaged. The following are the measurements: length, 20.5 mm.; lower end,

¹ Deep-Sea Madreporaria of the Siboga Exped., p. 37.

² Investigator Deep-Sea Madreporaria, plate 3, fig. 5a.

greater diameter, 6.5 mm., lesser, 5.5 mm.; upper end, greater diameter, 7 mm., lesser, 5.5 mm.

The upper edge of the wall is rather thin, but below it is very much thickened—there is so much internal deposit that practically the whole of the internal structures are obliterated. An incomplete, pellicular epitheca extends to within 5 mm. of the calicular edge. The wall is costate, the costae are perforated, low, sub-acute, and granulated on the edge, with narrow, perforated intercostal furrows. Every fourth costa is slightly larger than those intervening.

The septa are in four complete cycles, the primaries and secondaries are equal and extend directly to the columella, the tertiaries are included between the distally diverging quaternaries, which fuse before the tertiaries and are connected by a plate with the columella. The primaries, secondaries, and quaternaries are thick, the tertiaries are decidedly thinner. The septal margins are only slightly exsert, arched above, the inner margin falling perpendicularly to the periphery of the columella. The septal faces are densely beset with obtuse or truncated granulations, which, especially near the septal margins, show serial arrangement.

The columella is large and prominent, greater diameter, 3.5 mm., half the greater diameter of the calice; lesser diameter, about 2 mm., one-third the lesser diameter of the calice. Its upper surface is slightly domed, rising above the level of the septal fusion to its sides. It is composed of thin curled flakes that are united one to another by synapticula.

The calicular fossa is shallow, about 1.5 mm. its maximum depth.

Locality:—Station 4643, southeast of the Galapagos Islands, about $4\frac{1}{2}$ miles west by south from the west end of Hood Island; depth, 100 fms.; bottom, broken shells and Globigerina; temperature of the bottom, 67.2°.

Remarks:—This species is so peculiar that I do not know of any other one with which to compare it. It presents only generic similarity to *B. elegans* Verrill, from the Pacific coast of the United States, and it is not closely related to any of the Hawaiian species of Balanophyllia known to me. Probably *B. (Thecopsammia) gemma* Moseley is the most similar, but *B. galapagensis* is much more elongate, and differs in the details of the septal arrangement.

ACROPORA OKEN.

Four specimens belonging to this genus were obtained from Manga Reva. One specimen is incrustated with nullipores and is not in condition for positive specific determination, it, however, is closely related to *Acropora (Tylostoma) humilis* (Dana) and may belong to that species.

It is with a feeling of positive regret that I describe two supposedly new species of this genus, but I have been utterly unable to refer them to any described species.

Acropora mangarevensis, sp. nov.

Plate 6, Fig. 2; Plate 8, Fig. 1.

Corallum rising from a stout pedicel, 61 by 35 mm. in diameter, irregularly vase-form, fusion of the branches imperfect near the periphery. Height of specimen, 20 cm.; diameter of vase, 24.5 cm.; depth of vase, 7.7 cm.

The upper surface is occupied by short erect branches, which are conical in shape in the central portion. One of the central branches is 14 mm. in diameter at the base, and 14 mm. in height. Outside the central area, as the wall of the vase slopes rather steeply, the outer angle between a branch and the branch from which it rises or the common wall, is acute. The maximum length of the free portion of a branch is 27 mm.; the branches are radially compressed, diameter along a radius 12 mm. (a little more than 1 cm.), perpendicular to a radius 1 cm. or slightly less. Apices from 1 to 2 cm. apart. Nearly all the branches bear branchlets or proliferous calices.

Calices on the expansion below the pedicel immersed, from the base of the pedicel to the upper edge the immersed calices become progressively fewer, while slightly protuberant ones become more numerous. Apertures labellate or circular; the inner wall may or may not be elevated. The maximum height of these external corallites is about 2 mm.; diameter of base about 2 mm.; calicular diameter about 2 mm.; diameter of aperture about .75 mm. The corallites decrease in diameter toward the calices very slightly. Corallite wall costate, perforate. The corallites of the upper surface are immersed between the bases of the branches, about 1 mm. in diameter; on the branches there are immersed corallites, the other corallites may be labellate with only the outer wall developed, nariform or tall and proliferous. The diameter of the calicular aperture is about .75 mm., one of the long corallites is 3.5 mm. in length. The apical corallites are frequently aborted, when present, 1.75 mm. is probably an average diameter, projecting about 1 mm. The corallite walls are acutely costate, and often imperforate except near the upper edge.

Two cycles of septa are uniformly well developed, the directives more pronounced.

Coenenchyma echinulately striate, perforate, but with a tendency to compactness.

Locality:—Manga Reva.

Remarks:—I do not know of any other species that closely resembles this one; there is a superficial resemblance to all other vasiform, or palmate *Acropora*, but there the resemblance, so far as my knowledge goes, stops.

Acropora diomedae, sp. nov.

Plate 7, Figs. 1, 1 a; Plate 8, Figs. 2, 3.

Corallum vasiform, with a pedicellate base. The branches fusing completely except near the periphery.

Height, 20.7 cm.; diameter of vase, 32 cm.

The upper surface is occupied by short erect, or sub-erect branches that rise from a common plateau. They are irregular in height and diameter, between 3 and 3.5 cm. tall near the periphery, and 8 mm. in diameter at the base; at the center the height is about 2.5 cm., diameter at base may be as little as 7 mm. The distance apart of the bases is usually less than 1 cm., 6 to 8 mm. Very few of the branches are single, finger-like processes, most of them bear less developed lateral branchlets or proliferous calices.

Calices of the lower surface immersed near the lower edge of the pedicel; some, but a very few, are immersed on the bowl portion of the vase. The other calices slightly elevated, appressed, with distally directed, circular apertures. The corallites are

tubular, with complete inner walls. The length varies up to 5 mm., aperture above the surface up to 2.5 mm.; calicular diameter of the corallites about 1 mm., basal 1.5 mm. Walls perforate, sharply costate. The calices of the upper surface represent several types: (a) those between the bases of the branches are immersed; (b) on the branches; apical corallites tubular, 1.5 mm. in diameter, projecting as much; calicular aperture .75 mm., walls sharply costate and perforate; the lateral calices are of at least three kinds, elongated, proliferous calices that may develop branchlets; ascending calices with very oblique apertures, height may be as much as 4 mm., diameter about 1 mm. The inner wall is rarely or never so well developed as the outer, but it is rarely absent; the outer lips of the calices are sometimes curved inward. In addition to the proliferous and simple ascending lateral calices, there are immersed or subimmersed calices, which become more numerous towards the base of the branch.

Septa in the apical corallites, six; in the lateral corallites of the branches the directives are distinct, the others are usually rudimentary. The septa of the under surface are very variable in development. There may be from less than six to two complete cycles.

Coenenchyma porous and echinulate.

Locality: — Manga Reva.

Remark: — This is the only vasiform *Acropora* whose calices have only six septa known to me.

Acropora aff. *canaliculata* (Klunzinger).

Plate 5, Figs. 1-1b.

1879. *Madrepora canaliculata* Klunzinger, Korallenth. Roth. Meer. 2, p. 12, Plate 7, Fig. 3, Plate 4, Fig. 10, Plate 9, Fig. 8.

I have been unable to decide positively to what species a piece of a corallum from Manga Reva should be referred. It belongs to Brook's subgenus *Tylopora*, to Section C of that subgenus, and to subdivision *b* of Section C. It groups with *A. seriata*, *A. pyramidalis*, and *A. canaliculata*. I have considered it nearer to *A. canaliculata* because of practically complete agreement with Klunzinger's figures of the general habit of the corallum, and the detail of a single branch, Plate 7, Fig. 3, Plate 4, Fig. 10. As three figures are given of the Manga Reva specimen, a detailed description is not necessary. The branchlets are rather thicker than Klunzinger's figures indicate, and the apical corallite is 4 mm. in maximum diameter. The radial calices are of three kinds; some are sunken, others in which the upper wall is wanting, and still others with a developed upper wall, among the last are occasionally some that are subtubular. The tubular calices are slightly dilated at the mouth. No calices with a longitudinal slit in the upper wall, such as is represented in Klunzinger's Plate 9, fig. 8 c-d, were seen;

fig. 8 e-f represent the usual condition very well. I wish to call attention to four possible differences between the Manga Reva specimen and *A. canaliculata*:— 1. the somewhat thicker branches; 2. its slightly smaller apical corallites; 3. the absence of radial corallites with slit upper walls; 4. the occurrence of a few calices that are slightly dilated at the mouth. Of these differences, No. 3 can probably be entirely discarded, as the usual form of the calices corresponds to that for *A. canaliculata*. The other differences are in degree. I therefore think that the Manga Reva is *A. canaliculata*, but with so little material a positive identification is hazardous.

Locality:— Outer edge, Motus reef flats, Manga Reva.

Porites paschalensis, sp. nov.

Plates 9, 10.

Corallum attached by a large base, increasing in diameter as it grows upward, upper surface flat, with rather wide shallow furrows and some circumscribed depressions. Height of largest specimen 15 cm., greatest distance across the top, 22 cm. Plate 9 gives two views, natural size, of a smaller specimen, and shows the mode of growth.

Calices polygonal, varying greatly in size; on the more elevated portions of the upper surface they may be fully 2 mm. in diameter, while in neighboring depressions the diameter may be scarcely 1 mm.; on the sides 2 mm. is the maximum diameter. The variation in depth is considerable, on the upper surface relatively deep, between .5 and .75 mm.; on the sides, shallow.

The walls between neighboring calices are thin, elevated, with numerous perforations between the synapticula joining the component trabeculae; the upper edge is spinulose, and with spinules more numerous than the septa, the spinules irregularly granulated. On the sides of the corallum, within the wall and at a lower level is a fairly regular ring of thick synapticula, above each of which is a frosted granulation. The trabeculae forming this ring are what Bernard calls the "wall trabeculae."¹ There is intervening between the mural trabeculae and the pali usually a ring of elevated, pointed spines, Bernard's "septal granules," which equal in height the mural granules and exceed that of the pali. The pali are distinct low points. The columella is a compressed tubercle, situated in a depression.

The dorsal, solitary, directive and the lateral pairs bear pali as is usual in the genus. The members of the ventral triplet are not intimately united, although their ends are joined by the palar ring. The middle septum of the triplet may bear a palus, but usually in this group the septal granules simulate pali and seem to form part of the palar ring.

The preceding description of the wall and septa is based upon the calices on the sides of the corallum; on the top, the wall ridge is decidedly

¹ Cat. Madrep. Corals, Brit. Mus. 5. The Genus *Porites*, p. 14, 273, 1905.

more elevated, but the septa, although distinct and arranged as on the sides, do not have the various trabecular elements so clearly differentiated, the latter, however, are the same in number and arrangement on both sides and top.

Locality: — Easter Island.

Remarks: — This species belongs in division "B" of Bernard's "Analysis and distribution of types of calices," "Forms in which one ring of extra, intervening, or costal trabeculae appears typically in the walls."

There are four forms in Bernard's Catalogue of Porites to which the one under consideration is closely related, they are:

1. P. Fiji Islands (24) 4, p. 46.
2. P. Ellice Islands (17) 8, p. 70.
3. P. Ellice Islands (17) 9, p. 72.
4. P. Ellice Islands (17) 10, p. 73.

The calices of the last three are somewhat smaller than in the Easter Island form; the resemblance to the first is extremely close, but its skeleton seems denser. As none of the forms with which comparison is made have been named specifically, the validity of *P. paschalensis* is not affected should it prove identical with one of them.